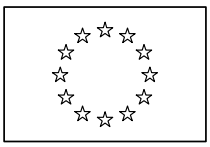


COMMISSION OF THE EUROPEAN COMMUNITIES

Brussels, 2.3.2005
COM(2005) 69 final

REPORT FROM THE COMMISSION

Quality of petrol and diesel fuel used for road transport in the European Union

Second annual report
(Reporting year 2003)

1. EXECUTIVE SUMMARY

Directive 98/70/EC[1] sets technical specifications on health and environmental grounds for fuels to be used for vehicles equipped with positive-ignition and compression-ignition engines. Directive 2003/17/EC[2], amending 98/70/EC, requires a further reduction of the sulphur content of petrol and diesel fuels.

Violations of these specifications can lead to increased emissions and can damage the engine and exhaust after-treatment systems. In order to ensure compliance with the fuel quality standards required under this Directive, Member States must introduce fuel quality monitoring systems.

Article 8 of Directive 98/70/EC, as amended by Article 1(5) of Directive 2003/17/EC, requires the Commission to publish annually a report on the actual fuel quality in the different Member States. In compliance with this request this second Commission Report briefly summarises Member States' submissions on the quality of petrol and diesel, as well as the volumes sold, for the year 2003[3]. All Member States but France submitted national reports for 2003.

Fuel quality monitoring in 2003 shows that the specifications for petrol and diesel laid down in Directive 98/70/EC were generally met. Very few violations were identified. For petrol the main parameters of concern were research octane number (RON, 14+ samples), summer vapour pressure (DVPE, 10+ samples) and distillation - evaporation at 100°C (6+ samples). For diesel the parameters of concern were sulphur content (5 samples), distillation 95% point (2 samples), cetane number (1 sample), density (1 sample) and PAH (1 sample). The Commission has not identified any negative repercussions on vehicle emissions or engine functioning but continues to urge Member States to take action in order to ensure full compliance. Most of them are doing so already, and details of the action taken by Member States with regard to non-compliance are included, where provided, in the individual country chapters of the detailed reports for the years 2001 and 2002[4]. The Commission will continue urging Member States to ensure full compliance with the fuel quality requirements laid down in the Directive.

For the abatement of air pollution and the introduction of new engine technology it is important to note that the share of <10 ppm and <50 ppm sulphur fuels increased significantly from 2001 to 2003. Overall a general trend towards lower sulphur content in petrol and diesel fuel can be identified, as shown in Table 1.

---

1 O.J. L 350 of 28.12.1998, p. 58
2 O.J. L76 of 22.3.2003, p. 10
3 The reporting years 2001 and 2002 are covered by COM(2004)310 final
4 See http://europa.eu.int/comm/environment/air/transport.htm#2

Table 1: Annual trend in average sulphur content in petrol and diesel fuels for the EU15

Fuel / Year	2001	2002	2003*	2002*
Petrol	68	51	31	39
Diesel	223	169	102	109

*Excludes France.

The fuel quality monitoring systems established at national level still differ considerably. However, the implementation of Directive 2003/17/EC is expected to promote a larger homogeneity in national monitoring systems and to improve the quality of reporting.

2. INTRODUCTION

The specifications for petrol and diesel sold in the European Union are laid down in Directive 98/70/EC. Two sets of specifications are included in the Directive; the first entered into force on 1 January 2000 and the second on 1 January 2005. The Directive also requires Member States to report summaries of the quality of fuels sold in their territories. For reporting on monitoring carried out up to the end of 2003 the format laid out in Commission Decision 2002/159/EC of 18 February 2002[5] should be applied. For reporting on monitoring from 2004 on Member States must report in accordance with the new European Standard, EN 14274, or with systems of equivalent confidence. Article 8 of Directive 98/70/EC, as amended by Article 1(5) of Directive 2003/17/EC, requires the Commission to forward the results of Member States' fuel quality reporting. In compliance with this request this second Commission Report summarises the quality of petrol and diesel, as well as the volumes sold, in the Community for the year 2003. The reporting years 2001 and 2002 are covered by the first Commission Report[6]. A detailed summary of the national reports can be found on the Commission's web page[7]. Additional reporting requirements laid down in Directive 2003/17/EC, e.g. the availability and geographical coverage of fuels with a maximum sulphur content of 10 mg/kg, are not covered by this report since Member States are not reporting in accordance with this requirement before the transposition of the Directive into national legislation is completed, i.e. at best by mid 2005, covering the reporting year 2004.

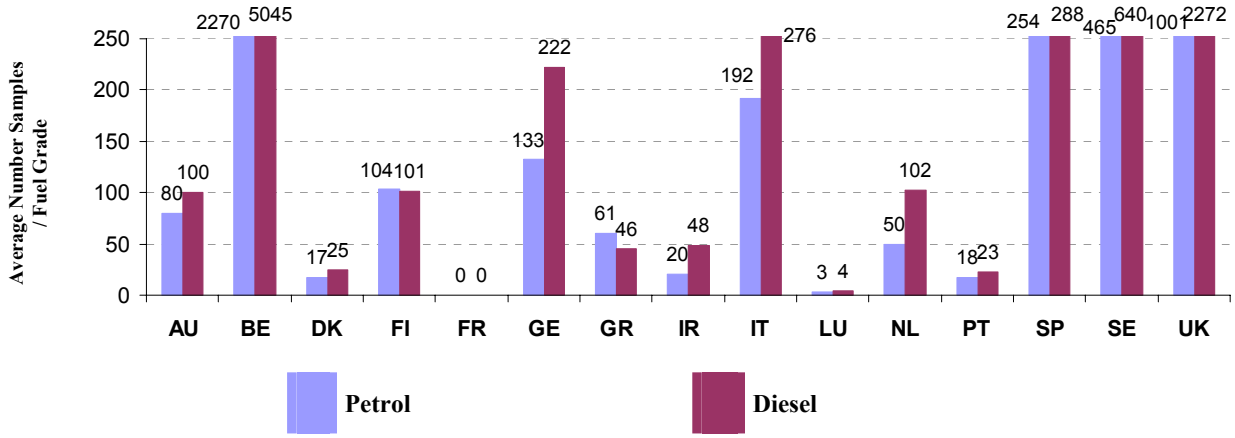
3. NATIONAL MONITORING SYSTEMS

Different approaches have been made to implementing fuel quality monitoring systems across the EU. These range from simple sampling at a range of fuel retail stations at certain periods during the year (e.g. Netherlands) through to integration of sampling and analysis of all refinery or imported batches into the requirements for distribution of fuels within the country, together with random sampling across the distribution chain throughout the year (e.g. Sweden and the UK). Several Member States' systems were designed for other purposes – explaining some of the variations in coverage and application across the EU. A greater degree of homogeneity is expected from the 2004 reporting round, as Member States must now monitor

[5] O.J. L 53 of 23.2.2002, p.30
[6] COM(2004)310 final
[7] http://europa.eu.int/comm/environment/air/transport.htm#2

and report in accordance to the new European Standard, EN 14274[8]. In fact, some amendments or changes have already been made to monitoring systems since the 2001 and 2002 reporting rounds, with Austria, Finland, Germany, Italy, the Netherlands and Spain moving their systems towards compliance with the recently adopted EN 14274. Finland, Germany, Italy, Spain, Sweden and the UK are already close to satisfying these specifications for sampling numbers (see Figure 1). The Directive permits alternative monitoring systems provided such systems ensure results of an equivalent confidence. However, it is not known exactly yet how Member States will make use of this possibility.

Figure 1: Fuel Quality Monitoring sampling rate across the EU (average number of samples per fuel grade)



4. 2003 REPORTING

4.1 Fuel Qualities and Volumes

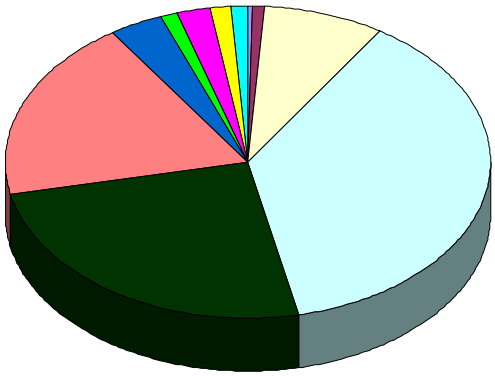
In 2003, while a wide variety of RON and sulphur grade fuels were available across the EU, the majority of sales comprised of RON95 (81%, with 37.5% regular, 24.8% low sulphur and 18.9% sulphur free[9]), see Figure 2 and the Annex for full details by Member State (no submission was provided by France for 2003 fuel quality monitoring). Of all petrol sold, 44% was regular sulphur grade, 28% low sulphur (<50 ppm) and 28% sulphur free (<10 ppm). Of all diesel sold the equivalent split was 45%, 30% and 25%. Overall a remarkable shift towards <10 ppm and <50 ppm qualities could be observed in 2003. This signals that the fuel providing industries are well prepared for meeting the 2005 deadline.

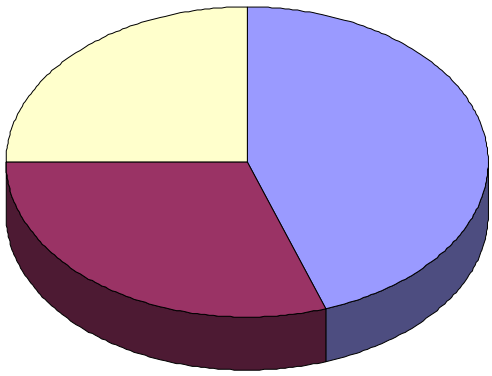
[8] EN 14274:2003 - Automotive fuels - Assessment of petrol and diesel quality - Fuel Quality Monitoring System

[9] The term "regular" is used for fuels with a sulphur content which is in accordance with Directive 98/70/EC (150 ppm for petrol and 350 ppm for diesel); the term "low sulphur" corresponds to a sulphur content of 50 ppm; the term "sulphur free" to a sulphur content of 10 ppm

Figure 2: EU Fuel sales proportions by fuel type (%)

Petrol Sales 2003 **Diesel Sales 2003**



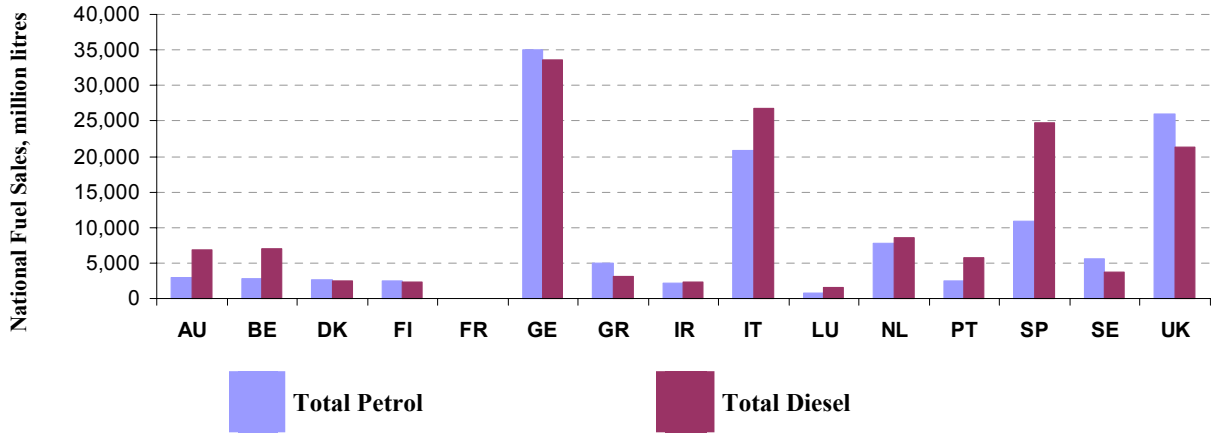


Fuel Type	%
Unleaded petrol min. RON=91	0.4%
Unleaded petrol min. RON=91 (<50 ppm S)	0.6%
Unleaded petrol min. RON=91 (<10 ppm S)	8.2%
Unleaded petrol min. RON=95	37.5%
Unleaded petrol min. RON=95 (<50 ppm S)	24.8%
Unleaded petrol min. RON=95 (<10 ppm S)	18.9%
Unleaded petrol 95=<RON<98	3.7%
Unleaded petrol 95=<RON<98 (<50 ppm S)	0.9%
Unleaded petrol 95=<RON<98 (<10 ppm S)	0.0%
Unleaded petrol RON>=98	2.3%
Unleaded petrol RON>=98 (<50 ppm S)	1.4%
Unleaded petrol RON>=98 (<10 ppm S)	1.2%

Fuel Type	%
Diesel	44.8%
Diesel (<50 ppm sulphur)	30.3%
Diesel (<10 ppm sulphur)	24.9%

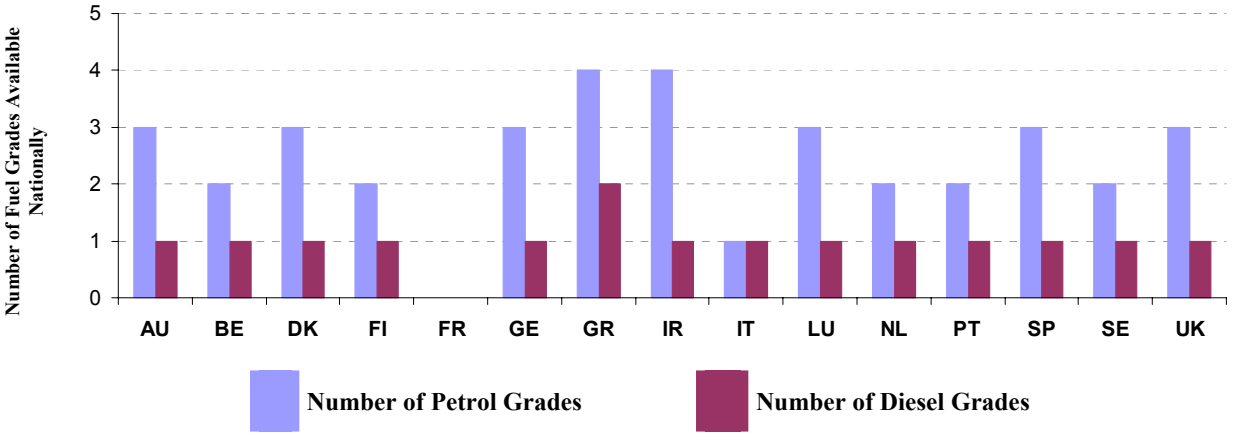
As in 2001 and 2002, the largest total sales of fuels in 2003 were in Germany, Italy, Spain and the UK **(Figure 3)**. While diesel sales are dominant in many Member States, there are still variations in relative sales of petrol and diesel. For example in Spain and the UK the differences are particularly pronounced, with diesel sales in Spain significantly higher than petrol sales while it is just the opposite in the UK.

Figure 3: National fuel sales by fuel type across the EU (million litres)



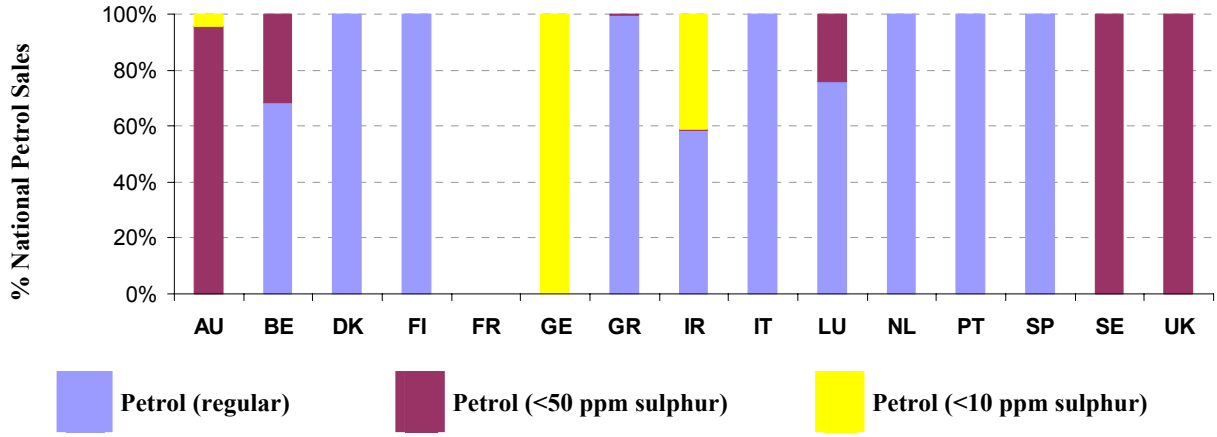
There also remained a variation in the number of grades of fuel reported to be available across the EU **(Figure 4)** in 2003, with more petrol grades available. With the availability of low sulphur fuel grades in Greece, seven Member States defined *national fuel grades* for low (<50 ppm) or sulphur free (<10 ppm) fuels.

Figure 4: Number of fuel grades available nationally by fuel type across the EU



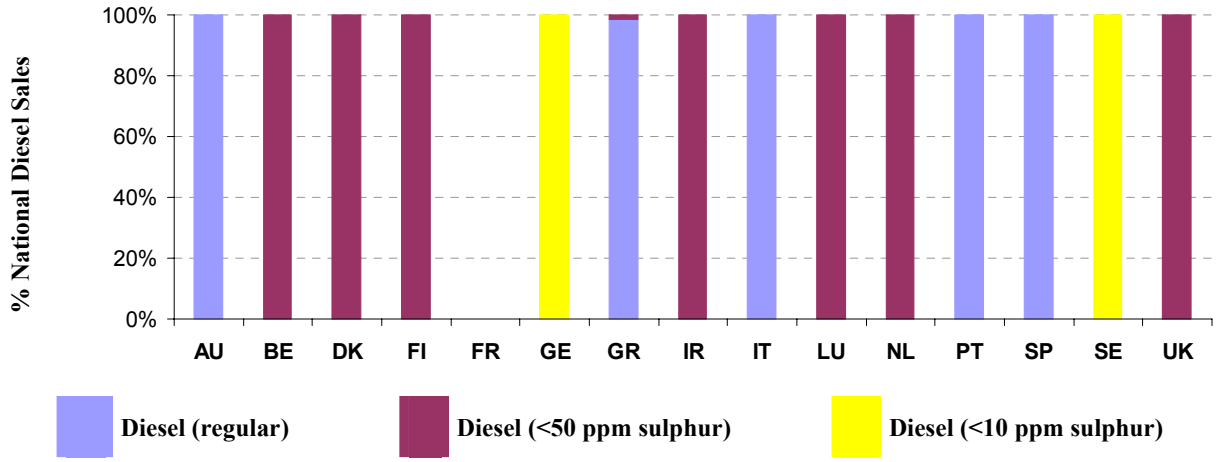
In 2001 and 2002 low sulphur fuels were already available in many countries across the EU, even though mandatory introduction is not required until 2005 (see Figure 5 and 6). Italy and Portugal are yet to introduce separately marketed low (<50 ppm) or sulphur free (<10 ppm) fuels. Compared to 2002, Greece has introduced petrol and diesel fuels of the <50 ppm quality and Belgium has introduced a <50 ppm petrol grade.

Figure 5: National sales of low sulphur petrol grades across the EU (%)



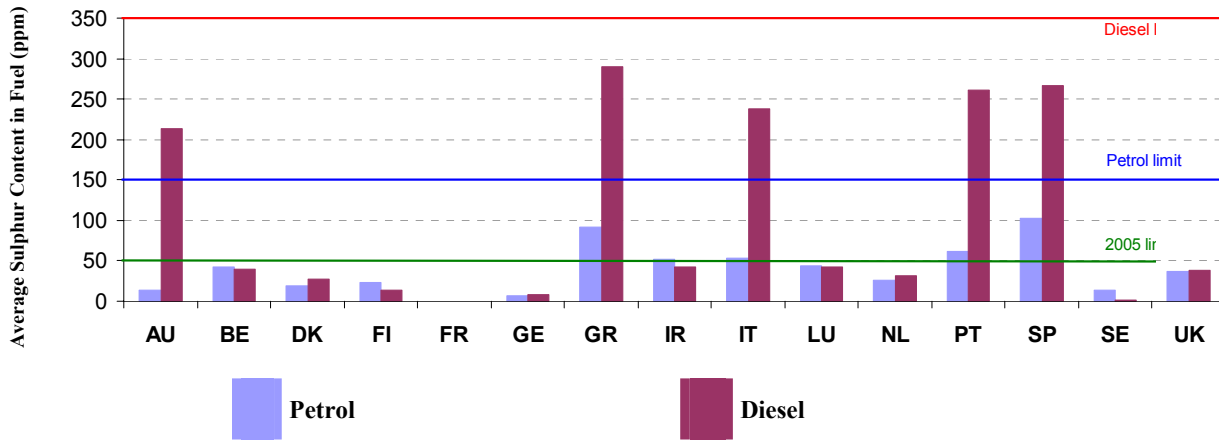
Sulphur free petrol was available in Austria, Germany, Ireland and Sweden, and Germany had moved completely over to low sulphur diesel.

Figure 6: National sales of low sulphur diesel grades across the EU (%)



In some Member States, although separate low or zero sulphur fuel grades or separate sales figures were not available in 2003, fuels complying with these criteria were available (eg in Denmark, Finland, Italy and the Netherlands). This can be seen in **Figure 7**, which presents the average sulphur content of petrol and diesel grades by Member State across the EU. (Average sulphur content is calculated from the mean sulphur content from reporting on the sampled fuels, weighted to the quantities of different petrol or diesel fuel grades sold).

Figure 7: Average sulphur content of petrol and diesel grades across the EU (%)



4.2 Compliance with Directive 98/70/EC in 2003

In terms of compliance with Directive 98/70/EC, only four Member States (Luxembourg, Portugal, Spain and Sweden) were in complete compliance with limit values for both petrol and diesel for all samples (compared to five in 2001 and 2002). Only Luxembourg, Portugal and Spain also provided complete reporting across the range of parameters specified for monitoring in the Directive.

In 2003, nine Member States reported at least one petrol sample that was non-compliant (compared to ten in 2001 and nine in 2002). Of these, the main parameters of concern were research octane number (RON, 14+ samples), summer vapour pressure (DVPE, 10+ samples) and distillation - evaporation at 100°C (6+ samples). However, while many Member States reported non-compliant samples, far fewer samples exceeded the limit values (and the limits of tolerance for test methods) than in previous years.

For diesel reporting, five Member States reported at least one sample that was non-compliant (compared to four in 2001 and six in 2002). Of these, the parameters of concern were sulphur content (5 samples), distillation 95% point (2 samples), cetane number (1 sample), density (1 sample) and PAH (1 sample). However, although several Member States reported non-compliant samples, far fewer samples exceeded the limit values (and the limits of tolerance for test methods) than in previous years.

Table 2 summarises Member States' compliance with Directive 98/70/EC for 2003 reporting in terms of the analysis of samples against limit values and the reporting format and content. The quality of compliance assessment suffers in some cases from incomplete information provided by Member States. Details of action taken by Member States with regard to non-compliance are included, where provided, in the individual country chapters of the detailed report for the year 2003[10].

[10] See http://europa.eu.int/comm/environment/air/transport.htm#2

Table 2: Summary of Member State compliance with 98/70/EC for 2003 reporting.

Member State	Limit value non-compliance (95% confidence limits) [1]				Incomplete reporting				Late report [2]	Notes
	Petrol		Diesel		Petrol		Diesel			
Austria	**X**	6 / 240	**X**	1 / 100	**X**	1 / 18			**X**	**(3)**
Belgium	**X**	>10 / 4539	**X**	>2 / 5045	**X**	1 / 18			**X**	**(4)**
Denmark	**X**	1 / 52			**X**	9 / 18				**(5)**
Finland	**X**	3 / 207								
France	**No report submitted for 2003**									
Germany	**X**	2 / 399	**X**	1 / 222					**X**	
Greece			**X**	2 / 91						
Ireland	**X**	8 / 80							**X**	
Italy	**X**	4 / 192	**X**	2 / 276						
Luxembourg									**X**	
Netherlands	**X**	1 / 100							**X**	
Portugal					**(X)**	5 / 18				**(6)**
Spain									**X**	
Sweden					**X**	6 / 18				
UK	**X**	2 / 3003							**X**	
Total EU	**8**		**4**		**4**		**0**		**9**	

Notes:

(1) It is not possible to confirm whether limit values have been respected in all samples, where reporting data is incomplete.
(2) Directive 98/70/EC states that Member States should submit monitoring reports by no later than 30th June each year.
(3) Leaded petrol has been banned in Austria since 1993. Random testing of lead content ended in 1998, as samples always complied.
(4) Belgium's submission did not state the total number of non-compliant samples; only the minimum number could be established.
(5) Denmark only measured parameters expected to have significant impact on the environment. For petrol: RON, MON, oxygen content and all oxygenates (except ethers/MTBE) were not measured.
(6) Portugal did not measure oxygenates other than ethers with more than 5 carbon atoms per molecule, stating that no other oxygenates are added to the fuel.

5. CONCLUSIONS

Monitoring of fuel quality in 2003 shows that the specifications for petrol and diesel laid down in Directive 98/70/EC were generally met. Very few violations were identified. The Commission has no indication of any negative repercussions on vehicle emissions or engine functioning due to these violations. However, the Commission continues to urge Member States to ensure full compliance with fuel quality requirements, having expressed its concern at a recent expert meeting and asked Member States to explain what measures are being taken to avoid future violations.

The recent amendments to Directive 98/70/EC (see Directive 2003/17/EC) included a new Article 9a which states *"Member States shall determine the penalties applicable to breaches of the national provisions adopted pursuant to this Directive. The penalties determined must be effective, proportionate and dissuasive."* It is expected that this will have a positive effect on compliance.

It should be noted that the share of <10 and <50 ppm sulphur fuels increased significantly from 2001 to 2003.

The fuel quality monitoring systems established at national level differ considerably and require further uniformity in order to provide transparent and comparable results. The implementation of Directive 2003/17/EC is expected to improve the quality of reporting as it will require Member States to report on monitoring in accordance with the new European Standard, EN 14274, or with systems of equivalent confidence.

ANNEX

2003 EU fuel sales by fuel type (million litres)

ID No.	Fuel grade	Austria	Belgium	Denmark	Finland	France	Germany	Greece	Ireland	Italy	Luxembourg	Netherlands	Portugal	Spain	Sweden	UK	EU15	EU15
1	Unleaded petrol min. RON=91	0	0	504	0		0	0	0	0	15	0	0	0	0	0	**EU**	**% Total**
2	Unleaded petrol min. RON=91 (<50 ppm S)	810	0	0	0		0	0	0	0	0	0	0	0	0	0	519	0.4%
3	Unleaded petrol min. RON=91 (<10 ppm S)	0	0	0	0		10,439	0	0	0	0	0	0	0	0	0	810	0.6%
4	Unleaded petrol min. RON=95	0	1,946	2,062	2,147		0	3,513	1,240	20,894	569	7,404	0	7,932	0	0	10,439	7.2%
5	Unleaded petrol min. RON=95 (<50 ppm S)	1,946	0	0	0		0	0	13	0	0	0	0	0	4,855	24,766	47,707	32.9%
6	Unleaded petrol min. RON=95 (<10 ppm S)	0	0	0	0		23,188	0	872	0	0	0	0	0	0	0	31,580	21.8%
7	Unleaded petrol 95=<RON<98	0	0	0	0		0	1,083	5	0	0	0	1,809	1,772	0	0	24,060	16.6%
8	Unleaded petrol 95=<RON<98 (<50 ppm S)	0	0	0	0		0	0	0	0	0	0	0	0	0	1,166	4,669	3.2%
9	Unleaded petrol 95=<RON<98 (<10 ppm S)	0	0	0	0		0	0	0	0	0	0	0	0	0	0	1,166	0.8%
10	Unleaded petrol RON>=98	0	0	27	322		0	350	0	0	0	344	657	1,183	0	0	0	0.0%
11	Unleaded petrol RON>=98 (<50 ppm S)	0	904	0	0		0	12	0	0	185	0	0	0	683	0	2,882	2.0%
12	Unleaded petrol RON>=98 (<10 ppm S)	127	0	0	0		1,373	0	0	0	0	0	0	0	0	0	1,783	1.2%
	Petrol (regular)	**0**	**1,946**	**2,593**	**2,469**		**0**	**4,945**	**1,245**	**20,894**	**583**	**7,748**	**2,466**	**10,888**	**0**	**0**	1,500	1.0%
	Petrol (<50 ppm sulphur)	**2,756**	**904**	**0**	**0**		**0**	**12**	**13**	**0**	**185**	**0**	**0**	**0**	**5,538**	**25,932**	**55,777**	**38.5%**
	Petrol (<10 ppm sulphur)	**127**	**0**	**0**	**0**		**35,001**	**0**	**872**	**0**	**0**	**0**	**0**	**0**	**0**	**0**	**35,338**	**24.4%**
	Total Petrol	**2,883**	**2,850**	**2,593**	**2,469**		**35,001**	**4,957**	**2,129**	**20,894**	**768**	**7,748**	**2,466**	**10,888**	**5,538**	**25,932**	**35,999**	**24.8%**
13	**Diesel**	6,868	0	0	2		0	3,077	0	26,745	0	0	5,712	24,814	0	0	**127,115**	**87.7%**
14	**Diesel (<50 ppm sulphur)**	0	6,970	2,415	2,262		0	48	2,286	0	1,600	8,535	0	0	0	21,306	67,217	37.0%
15	**Diesel (<10 ppm sulphur)**	0	0	0	0		33,591	0	0	0	0	0	0	0	3,799	0	45,423	25.0%
	Total Diesel	**6,868**	**6,970**	**2,415**	**2,264**		**33,591**	**3,124**	**2,286**	**26,745**	**1,600**	**8,535**	**5,712**	**24,814**	**3,799**	**21,306**	37,389	20.6%
																	150,029	**82.7%**